

REMARKS

The specification has been amended to correct a typographical error. Additionally, the specification has been amended to further describe elements of embodiments of the invention. Specifically, a length of a gate electrode is more fully described in connection with FIGS. 4 and 6A. Applicants respectfully submit that it is well known that transistor gate electrodes have a length. Further, the gate electrodes depicted in FIGS. 4 and 6A were depicted as having a length in FIGS. 4 and 6A as originally filed, although the length was not specifically identified. Therefore, Applicant respectfully submits that the amendments to the specification do not constitute new matter.

The drawings have been amended. In particular, FIGS. 4 and 6A have been amended to include the reference character L representing a length of a gate electrode. No new matter has been added.

Claims 1, 12, 30, 49 and 52 have been amended. Claims 24 and 72 have been canceled. Claims 14-23, 25-29, 42-48, 63-71 and 73-77 were previously withdrawn. Claims 1-13, 30-41 and 49-62 are currently pending in this application.

Claims 1, 8-11, 24, 30-32, 39-41, 52, 59-62 and 72 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Mann et al., U.S. Patent No. 6,768,149 (“Mann”). This rejection is respectfully traversed.

Claims 24 and 72 have been canceled.

Mann fails to disclose all limitations of any of claims 1, 8-11, 30-32, 39-41, 52 and 59-62. As amended, independent claims 1 and 30 each recite, *inter alia*, “a first transistor adjacent to the photo-conversion device, the first transistor comprising a gate

electrode and a channel region under the gate electrode, the gate electrode having a length extending from a source/drain region to the photo-conversion device and comprising at least one gate region extending the length of the gate electrode and having a work-function greater than a work-function of n+ Si, the channel region comprising at least one channel portion under the at least one gate region first and second gate regions each having a work-function greater than a work-function of n+ Si.” Similarly, amended independent claim 52 recites, *inter alia*, “forming the gate electrode having a length extending from a source/drain region to the photo-conversion device and forming at least one gate region extending the length of the gate electrode and having a work-function greater than a work-function of n+ Si” and “forming at least one channel portion under the at least one gate region.”

Mann relates to a sensor having a photodetector and a transistor acting as a reset switch. Mann at col. 3, lines 1-3. The transistor is formed with a transistor having a gate with p and n-type regions 312, 314. Mann discloses that the gate is formed having a length at least 20 percent longer than the process minimum. Mann at col. 4, lines 3-23. The n-type region of the gate 312 is adjacent the source 306 and the p-type region 314 is adjacent the drain 308. Therefore, each of the regions 312, 314 extends across only a portion of the length of the gate. Mann at FIG. 3. Further, contrary to the assertion of the Office Action, Mann does not disclose that the n-type region 312 is a lightly doped n-type region. Mann is silent about the dopant concentration of the region 312. Thus, Mann does not disclose a gate region having a work-function greater than a work function of n+ Si extending the length of the gate electrode. Therefore, Mann fails to disclose the above noted limitations of amended independent claims 1, 30 and 52. For at least these reasons, withdrawal of this rejection is respectfully requested.

Claims 2, 7, 12, 13, 33, 38, 53 and 58 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mann. This rejection is respectfully traversed.

As discussed above, Mann fails to disclose, teach or suggest all limitations of any of independent claims 1, 30 and 52. For at least these reasons, withdrawal of this rejection is respectfully requested.

Claims 3-6, 34-37 and 54-47 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mann in view of Ponomarev (Gate-Work-function Engineering Using Poly-(Si,Ge) for High Performance 0.18 μ m CMOS Technology, IDEM 1997). This rejection is respectfully traversed.

As discussed above, Mann fails to disclose, teach or suggest all limitations of any of independent claims 1, 30 and 52. Ponomarev is cited for teaching a gate comprising a mid-gap material including SiGe. Ponomarev, however, does not supplement the deficiencies of Mann. Therefore, even when considered in combination, Mann and Ponomarev fail to teach or suggest all limitations of any of independent claims 1, 30 and 52. For at least these reasons, withdrawal of this rejection is respectfully requested.

Claims 49-51 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mann in view of Boon, U.S. Patent No. 6,198,087 ("Boon"). This rejection is respectfully traversed.

Independent claim 49 recites a processor system. Like claims 1 and 30, as amended, independent claim 49 recites *inter alia*, a "gate electrode having a length extending from a source/drain region to the photo-conversion device and comprising at least one gate region extending the length of the gate electrode and having a work-

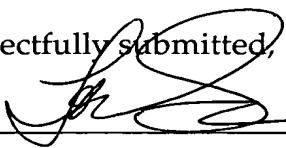
function greater than a work-function of n+ Si, the channel region comprising at least one channel portion under the-at least one gate region first and second gate regions each having a work-function greater than a work-function of n+ Si."

For at least the same reasons discussed above, Mann fails to disclose, teach or suggest at least the above noted limitations of independent claim 49. Boon is cited for teaching a processor and an image sensor coupled to the processor. Boon, however, does not supplement the deficiencies of Mann. Therefore, even when considered in combination, Mann and Boon fail to teach or suggest all limitations of any of independent claim 49. For at least these reasons, withdrawal of this rejection is respectfully requested.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

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Enclosures

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AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include changes to FIGS. 4 and 6A as described in the "Remarks" section of this amendment. The attached sheets replace the originally filed sheets containing FIGS. 4 and 6A.

Attachments: Replacement sheets containing FIGS. 4 and 6A.

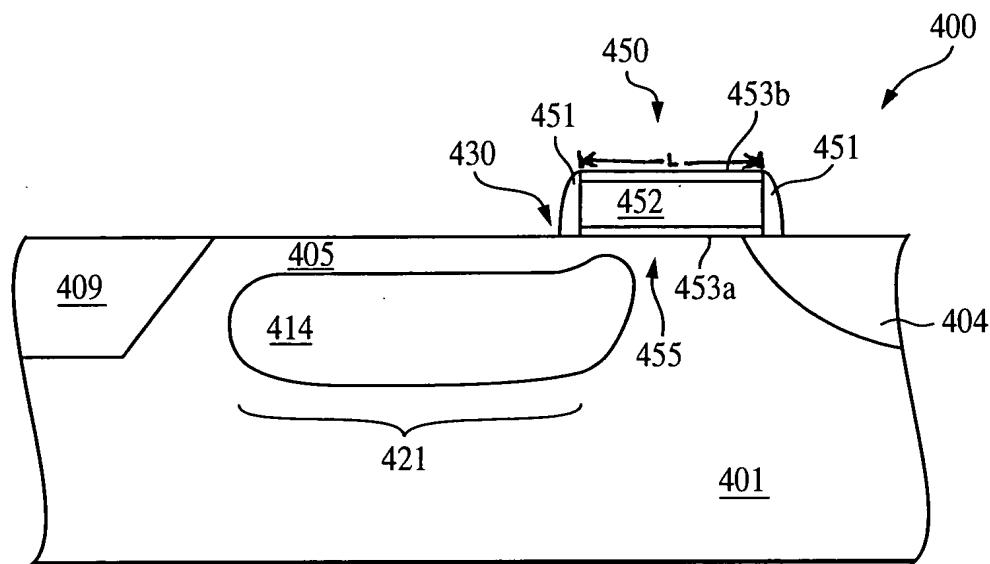


FIG. 4

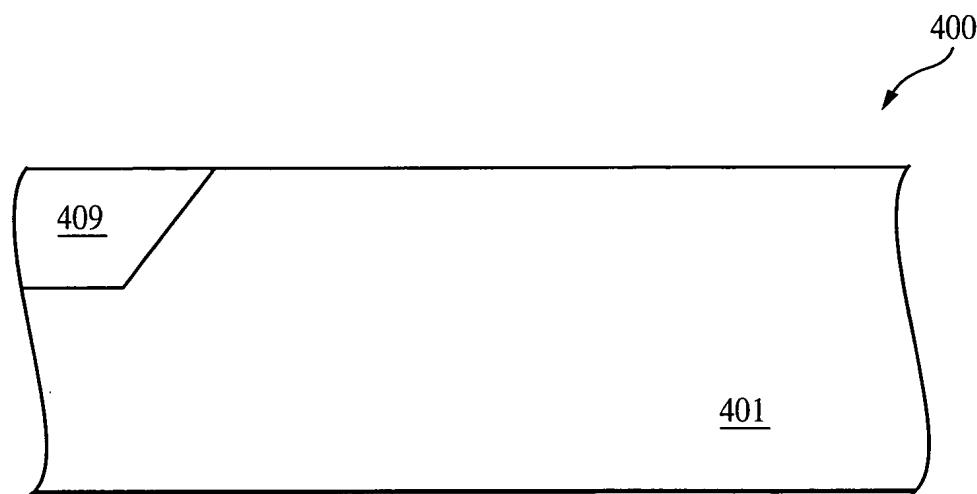


FIG. 5A

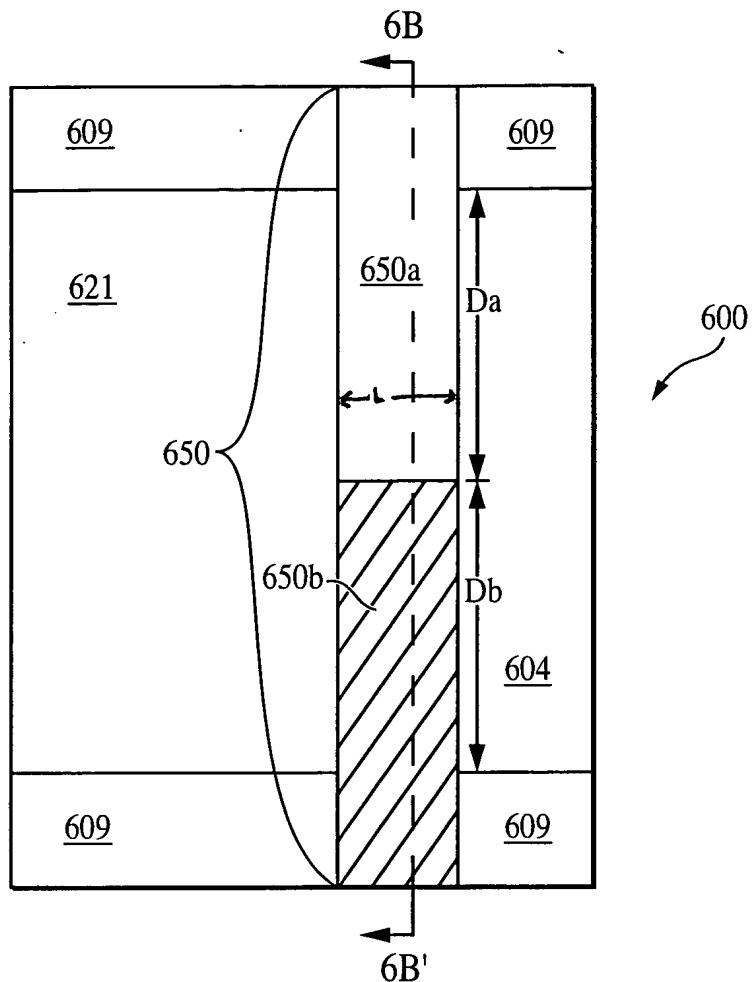


FIG. 6A

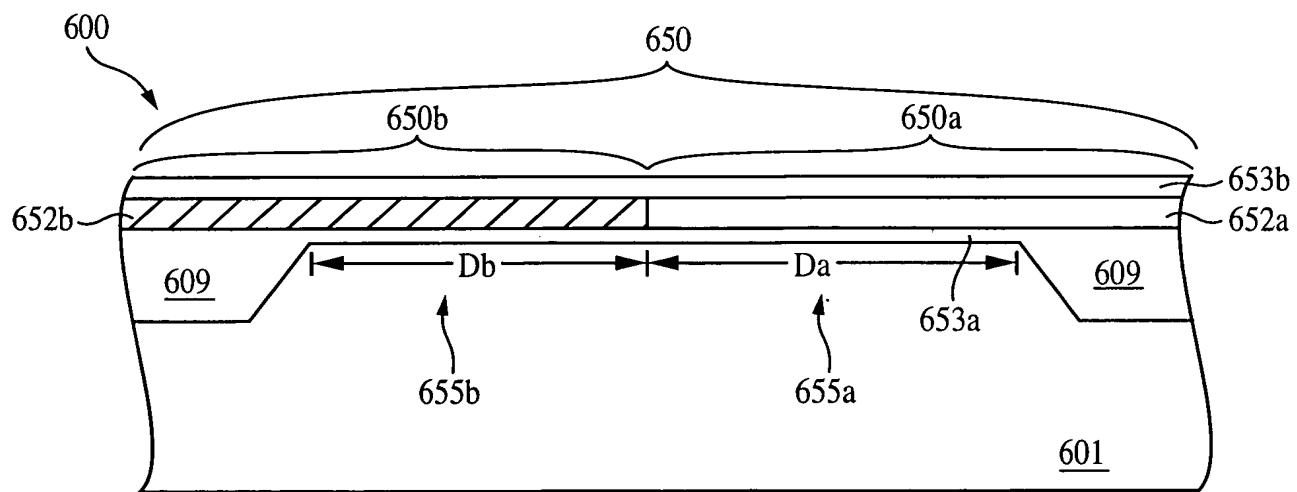


FIG. 6B